

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION
RIPARIAN FOREST BUFFER
(acre)
CODE 391

SCOPE

This document establishes the technical details, workmanship, and quality and extent of materials required to install the practice in accordance with the Conservation Practice Standard. The information shall be considered when preparing site-specific specifications for the practice.

The site-specific specifications for installing, operating, and maintaining the practice on a specific field or treatment unit shall be documented via the NRCS Hawaii Jobsheet for this practice and given to the client. Other documents such as practice worksheets, maps, drawings, and narrative statements in the conservation plan may be used to plan or design the practice and to prepare the site-specific specifications.

SPECIES SELECTION

Refer to Table 1 for a list of the species suitable for riparian forest buffer and choose those most compatible with the slope, soils, local growing conditions, and wildlife needs, as well as the landowner's concerns. The list is not all-inclusive. Species not included on the list may be used, with approval of the NRCS Hawaii State Resource Conservationist.

To help ensure against loss of buffer due to fire, insects, diseases, and other destructive forces, and to insure survival it is advisable to plant a variety of species with a variety of short and tall growth habits.

Species selected must be appropriate for the existing bank slope.

Species selected must also be appropriate for its intended purpose. If the sole purpose is to reduce sedimentation or nutrients, consider using an herbaceous planting practice if the existing cover is less than 75 percent.

BUFFER WIDTH DETERMINATION

Refer to Table 2 to determine buffer widths and conditions.

INSTALLATION PROCEDURES

Good planting stock will be used. Potting bare-root stock 3 to 4 months before planting will help produce more vigorous transplants. Dibble tube stock may be used if available and is preferred to bare-root stock. Cuttings may be rooted in pots or beds or planted directly in the riparian buffer unrooted, depending on the species, available moisture and other conditions.

Site Preparation

Control competitive grasses or shrubs where riparian buffer species are to be planted. Good site preparation will promote rapid growth and survival of plants. Herbicide or till and subsoil. If individual planting holes are dug through sod or untilled ground, make these as large as practicable and herbicide or clear a 2-foot diameter circle outside of the hole at the time of planting.

Planting

The source of native planting stock must be from a geographic area of similar climate and elevation range to that of the planting site.

Take care of planting stock. If bare-rootstock is not planted immediately, it should be "heeled-in" in a V-shaped trench under shade or potted and kept moist.

Plant bare-root stock slightly deeper than they were in the nursery.

Mulching around the seedlings will help to conserve moisture and control weeds. Organic mulches, cinders and plastic mulches are effective, but local site conditions must be considered.

Plant stock, particularly bare-root stock, during the time appropriate for establishment (for instance, planting may be done in the rainy season for optimum establishment). Irrigation for establishment may be necessary, depending on local rainfall.

Plant stock either in furrows or individual holes. Do not bend or crowd the roots. If planting in furrows, be sure the grade is on the contour.

Fertilization

Apply lime and fertilizer according to soil test results and recommendations.

At a minimum, do a field pH test and add lime as required according to DSTL curves and species requirements for soils. Contact the Plant Materials Specialist for specific requirements, if necessary. If planting must be done before soil test results have been completed or before fertilizer recommendations are received, it is recommended that 4 ounces of 10-30-10 or equivalent be mixed into the soil beneath the tree prior to planting or covered with about 1 inch of soil so the plant roots do not come in direct contact with the fertilizer. Slow release fertilizer tablets may also be used.

Follow up with fertilizer as needed according to soil test recommendations. Consider possible effects on water quality from deep percolation and run-off. Refer to the Nutrient Management Standard and water quality worksheets.

TABLE 1. LIST OF SPECIES SUITABLE FOR RIPARIAN FOREST BUFFER ^{1/}

(page 1 of 2)

| <u>Common Name</u> | <u>Scientific Name</u> | <u>Relative Growth rate</u> | <u>Approx. 20-yr Height (feet)</u> | <u>Plant Spacing (feet)</u> | <u>Adaptation</u> | | | <u>Functional Benefits ^{2/}</u> |
|---------------------|--------------------------------------|-----------------------------|------------------------------------|-----------------------------|-------------------------|--------------------------|---------------------------------|--|
| | | | | | <u>Elevation (feet)</u> | <u>Rainfall (inches)</u> | <u>Wetl. I.S. ^{3/}</u> | |
| 'a'ali'i | <i>Dodonaea viscosa</i> | Moderate | 10 | 10 X 10 | 0-7,000 | 20+ | UPL | 1 - 5 |
| akia | <i>Wikstroemia uva-ursi</i> | Rapid | 5 | 4X4 | 1,350-3,650 | 20+ | UPL | 1, 4, 5 |
| ala'a | <i>Pouteria sandwicensis</i> | Moderate | 25 | 10X10 | 800-3,000 | 60+ | UPL | 1 - 5 |
| alahe'e | <i>Canthium odoratum</i> | Moderate | 15 | 10X10 | 0-3,000 | 40+ | UPL | 1 - 5 |
| beach morning glory | <i>Ipomea pes-caprae</i> | Rapid | 1-6" | 1X1 | 0-1,200 | 20+ | FAC | 1 - 5 |
| beach vitex | <i>Vitex trifolia var. variegata</i> | Rapid | 15 | 4X4 | 0-4,000 | 50+ | UPL | 1 - 5 |
| bermuda juniper | <i>Juniperus bermudiana</i> | Moderate | 40 | 10X10 | 0-3500 | 40 | UPL | 2 - 5 |
| brushbox | <i>Tristania conferta</i> | Rapid | 60 | 10X10 | 0-3,000 | 20+ | UPL | 1, 4, 5 |
| coconut palm | <i>Cocos nucifera</i> | Moderate | 60 | 10X10 | 0-1,500 | 20+ | FACU | 4, 5 |
| dracaena | <i>Dracaena dermensis</i> | Moderate | 15 | 6X6 | 0-2,000 | 50+ | UPL | 1 - 5 |
| dracaena | <i>Dracaena fragrans</i> | Moderate | 15 | 6X6 | 0-2,000 | 50+ | UPL | 1 - 5 |
| false kamani | <i>Terminalia catappa</i> | Moderate | 60 | 10X10 | 1,500-8,000 | 30+ | UPL | 4, 5 |
| hala | <i>Pandanus tectorius</i> | Moderate | 20-30 | 10X10 | 0-2,000 | 40+ | FAC* | 1, 4, 5 |
| hapu'u | <i>Cibotium sp.</i> | Moderate | 15 | 10X10 | 100-7,000 | 40+ | FAC* | 1 - 5 |
| hau | <i>Hibiscus tiliaceus</i> | Moderate | 7-35 | 10X10 | 0-1,000 | 30+ | FAC W | 1 - 5 |
| kava | <i>Piper methysticum</i> | Rapid | 6" | 1X1 | 60-4,800 | 30+ | UPL | 1 - 5 |
| koa | <i>Acacia koa</i> | Moderate | 100 | 15X15 | 150-7,000 | 30+ | UPL | 1, 4, 5 |
| koaia | <i>Acacia koaia</i> | Moderate | 30 | 10X10 | 90-8,000 | 20+ | UPL | 1,4,5 |
| kolomona | <i>Senna guadichaudii</i> | Moderate | 10 | 6X6 | 20-3,000 | 20+ | UPL | 1 - 5 |
| kou | <i>Cordia subcordata</i> | Moderate | 10 | 10X10 | 0-500 | 30+ | UPL | 1 - 5 |

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- 2/ Functional benefits: 1. Wildlife Habitat; 2. Removal of Nutrients; 3. Removal of Sediment; 4. Bank Stabilization; 5. Flood Buffer.
3/ Wetland Indicator Status determined from the National List of Wetland Plant Species, Region H (USFWS 1988).

TABLE 1. LIST OF SPECIES SUITABLE FOR RIPARIAN FOREST BUFFER ^{1/}

(page 2 of 2)

| <u>Common Name</u> | <u>Scientific Name</u> | <u>Relative Growth rate</u> | <u>Approx. 20-yr Height (feet)</u> | <u>Plant Spacing (feet)</u> | <u>Adaptation</u> | | | <u>Functional Benefits ^{2/}</u> |
|---------------------|----------------------------------|-----------------------------|------------------------------------|-----------------------------|-------------------------|--------------------------|---------------------------------|--|
| | | | | | <u>Elevation (feet)</u> | <u>Rainfall (inches)</u> | <u>Wetl. I.S. ^{3/}</u> | |
| kukui | <i>Aleurites moluccana</i> | Rapid | 60 | 10X10 | 0-3,000 | 50+ | UPL | 1, 4, 5 |
| loulou | <i>Pritchardia spp.</i> | Moderate | 30 | 10X10 | 0-3,300 | 30+ | FAC* | 1, 4, 5 |
| lycium | <i>Lycium sandwicense</i> | Moderate | 3 | 4X4 | 0-1,200 | 20+ | FACU | 1 - 5 |
| mamaki | <i>Pipturus albidus</i> | Moderate | 15 | 6X6 | 230-6,100 | 60+ | UPL | 1 - 5 |
| mamane | <i>Sophora chrysophylla</i> | Moderate | 40 | 10X10 | 1,500-8,000 | 30+ | UPL | 1, 4, 5 |
| mihi | <i>Thespesia populnea</i> | Rapid | 30 | 10X10 | 0-2,000 | 20+ | FAC+ | 1, 4, 5 |
| naio | <i>Myoporum sandwicense</i> | Slow | 15 | | 0-7,500 | 30+ | UPL | 1 - 5 |
| naupaka | <i>Scaevola frutescens</i> | Moderate | 10 | 6X6 | 0-1,000 | 20+ | FACU | 1 - 5 |
| noni | <i>Morinda citrifolia</i> | Moderate | 20 | 10X10 | 0-1,500 | 30+ | NI | 1 - 5 |
| norfolk-island pine | <i>Araucaria heterophylla</i> | Moderate | 80 | 10X10 | 0-2200 | 30+ | UPL | 4, 5 |
| 'ohai | <i>Sesbania cannabina</i> | Moderate | 15 | 6X6 | 0-2700 | 30+ | FAC* | 1 - 5 |
| o'hai | <i>Sesbania tomentosa</i> | Moderate | 15 | 6X6 | 0-2700 | 30+ | UPL | 1 - 5 |
| ohi'a lehua | <i>Metrosideros polymorpha</i> | Moderate | 40 | 10X10 | 0-6,500 | 40+ | FAC- to FAC W | 1, 4, 5 |
| tall erythrina | <i>Erythrina variegata</i> | Rapid | 40 | 10X10 | 0-1,000 | 50+ | UPL | 4, 5 |
| ti | <i>Cordyline terminalis</i> | Rapid | 10 | 4X4 | 0-4,000 | 30+ | UPL | 2 – 5 |
| u'uilei | <i>Ostomelis anthyllidifolia</i> | Moderate | 8 | 4X4 | 0-4,000 | 20+ | UPL | 1 - 5 |
| wiliwili | <i>Erythrina sandwicensis</i> | Rapid | 30 | 10X10 | 0-2,000 | 60+ | UPL | 1, 4, 5 |

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^{2/} Functional benefits: 1. Wildlife Habitat; 2. Removal of Nutrients; 3. Removal of Sediment; 4. Bank Stabilization; 5. Flood Buffer.

^{3/} Wetland Indicator Status determined from the National List of Wetland Plant Species, Region H (USFWS 1988).

Table 2. DETERMINATION OF BUFFER WIDTH

Use the following table to determine the minimum width of the buffer to be planted from the ordinary high water mark or wetland edge to upper boundary. The buffer width may not be changed without approval of the State Resource Conservationist.

| Bank Slope | Minimum Riparian Area Buffer Width on Each Side (feet) ^{1/} | Conditions or Considerations ^{3/} |
|----------------------------------|--|--|
| 0 - 5% | 10 | A, B, C, D |
| 5 - 10% | 20 | A, C, D |
| 11 - 20% | 25 ^{2/} | C, D, E |
| 21 - 30% | 35 ^{2/} | C, D, E |
| 31 - 40% | 50 ^{2/} | C, D, E |
| 41 - 50% | 100 ^{2/} | C, D, E |
| Over 50%, buffer not recommended | | |

^{1/} Adjust minimum riparian area width, if purpose is:

1. Habitat: Creating shade to improve habitat or providing habitat, add 75% to width of trees and 30% to width of other woody vegetation.
2. Reducing nutrients: add 10% to width and consider combining this practice with one of the following practices: Filter Strip, Conservation Cover, or Critical Area Planting.
3. Reducing sediment in runoff: add 20% to width. To claim this purpose, the bank slope must be less than 5% or include the implementation of a herbaceous planting practice, such as Filter Strip, Conservation Cover, or Critical Area Planting.
4. Bank Stabilization: follow table.
5. Flood storage of surface water: add 20% to width.

If more than one of the above, use the largest increase in width.

^{2/} Revegetation above the bank (where it levels off) must be at least 10 feet wide.

^{3/} Conditions or considerations are as follows:

- A. Use low-lying woody vegetation only. For small riparian buffers, you may want to consider use of the Filter Strip, Conservation Cover, or Critical Area Planting practice instead of this practice.
- B. Unless treatment area is an ephemeral stream or intermittent stream, consider planting vegetative species with a wetland indicator status of FACU or wetter (FACU, FAC, FACW, OBL).
- C. Consider combining this practice with the Exclusion Zone Fencing practice, if riparian area degradation is due to grazing or feral ungulate damage.
- D. Consider combining this standard with the Brush Management or Pest Management practice, if riparian area degradation is due to noxious weeds.
- E. This practice must be combined with an herbaceous planting practice, such as Filter Strip, Conservation Cover, or Critical Area Planting, if the existing herbaceous cover is less than 75%.